UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,761	03/08/2006	Gerrit Cornelis Dubbeldam	126548	3376

25944 7590 05/11/2011

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER	
MOWLA, GOLAM	

ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
05/11/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OfficeAction25944@oliff.com
jarmstrong@oliff.com

Office Action Summary	Application No.	Applicant(s)	
	10/563,761	DUBBELDAM, GERRIT CORNELIS	
	Examiner	Art Unit	
	GOLAM MOWLA	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 September 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) *5,7,8,10 and 14* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6,9 and 11-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/03/2010 has been entered.

Response to Amendment

2. Applicant's amendment of 09/03/2010 does not place the Application in condition for allowance.

3. Claims 1-14 are currently pending. Applicant has amended claims 1-2, 4, 6-8 and 11-14. Claims 5, 7-8, 10 and 14 are withdrawn from consideration as being part of non-elected invention.

Status of the Objections or Rejections

4. Due to Applicant's amendment to claims 1-2, 4, 6 and 11-13, all rejections from the office Action dated 06/04/2010 are withdrawn. However, upon further consideration, a new ground of rejection is presented below.

Claim Rejections - 35 USC § 102

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Van Andel et al. (WO 98/13882 A1) with evidence provided by Jordan et al. (US 4,243,432).

Regarding claims 1 and 6, Van Andel discloses a roll-to-roll process (P1/L15-21 and P3/L4-9) for manufacturing a solar cell foil (figs. 1-13) (claims 1 and 11) (P9/L10-11 and P11/L18-P17/L2) comprising the steps of:

- providing an etchable temporary substrate (1) (fig. 1) (P17/L26-27);
- applying a front electrode (transparent conductor 2) of a transparent conductive oxide (TCO) (F-doped SnO_2) onto the temporary substrate (1) (figs. 2-4) (P18/L1-10);
- applying a photovoltaic layer (PV layer 6) onto the TCO (2) (figs. 5-7) (P18/L11-21);
- applying a back electrode (aluminum layer 10) (figs. 8-10) (P18/L23-27);
- applying a permanent carrier (carrier 14) (figs. 11-12) (P19/L1-4);
- ensuring the front electrode (2) and the back electrode (10) are electrically connected in an interconnect (9) (figs. 8-10) to establish a series connection (figs. 8-10) (P17/L7-15 and P18/L23-27),
    - the front (2) and the back (10) electrodes each being interrupted by a front (grooves 5 as shown in fig. 4) and back (grooves 12 as shown in fig. 10)

grooves, respectively, at different sides of the interconnect (9) (see figs. 4 and 10 for configuration);

- wherein in any of the preceding steps, applying an etch resist is provided on a second side (bottom side) of the temporary substrate (1) opposite to a first side (top side) of the temporary substrate (1) covering the interconnect (9) (fig. 10), and at least not at the entire location of the front groove (5) (P5/L12-21 and P16/L27-P17/L2); and
- followed by selectively removing the temporary substrate (1) where it is not covered with the etch resist (figs. 11-13) (P5/L12-21, P16/L27-P17/L2 and P19/L1-7) to obtain the solar cell foil provided with a protective cap (contact for connection to any auxiliary apparatus or net) (portion of the substrate which is not etched) (P5/L12-21 and P16/L27-P17/L2) on the TCO (2).

Although Van Andel does not explicitly state that the etch resist covers the interconnect (9) (fig. 10), this feature is implicit as a result of the application of the etch resist on the temporary substrate (1) at the locations where it is not needed that the incident light reach the transparent conductor (1) (P16/L27-P17/L2) (because these locations are not active parts of the solar cell foil that generates hole and electrons upon absorbing incident solar radiation) (MPEP §2144.01). Van Andel explicitly shows in figure 10 that there is no active part (no PV layer) of the solar cell foil at the position of the interconnect (9), and therefore, the etch resist is implicitly applied on the temporary substrate (1) at the locations (9) (fig. 10) because it is not needed that the incident light reach the transparent conductor (1) (P16/L27-P17/L2) (MPEP §2144.01).

Thus, the etch resist is implicitly formed on the interconnect (9) and in results covers the interconnect (9).

Van Andel discloses that the temporary substrate (1) is made of metal (P9/L10-11, P17/L26-27), and a part of the temporary substrate (1) is not etched out so that it can form a contact (instant claimed protective cap) on the TCO (2) (P5/L12-21 and P16/L27-P17/L2). It is well known to one skilled in the solar or photovoltaic art to electrically isolate the anodes or cathodes of adjacent solar cells in a series connection solar cell foil to avoid short-circuits (for example see US 4,243,432 which discloses that anodes or cathodes (12) of the adjacent solar cells of a series connected solar cell foil are electrically isolated from one another (fig. 2) (6:1-21)). Thus, one skilled in the solar or photovoltaic art realizes that a portion of the metal substrate (1) at the front groove 5 (fig. 6) is implicitly removed such that two adjacent stripes (2) electrically isolated from each other to avoid short-circuit (MPEP §2144.01). Therefore, Van Andel implicitly teaches that the etch resist is not provided at the entire location of the front groove, because the temporary substrate (1) is made of metal (P9/L10-11 and P17/L26-27) and leaving a portion of such substrate covering the entire front groove would electrically connect two adjacent stripes (2), which in results short-circuits the series connected solar cell foil, and thus, the solar cell foil of Van Andel would not function properly (MPEP §2144.01).

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 2 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Andel as applied to claim 1 above.

Regarding claim 2, Applicant is directed above for complete discussion of Van Andel with respect to claim 1, which is incorporated herein. Van Andel further discloses that the step of applying the etch resist on the second side (back side) of the temporary substrate (1) is performed before the step of selectively removing portions of the temporary substrate (1) (P16/L27-P27/L2). Although the reference is silent as to whether the step of applying the etch resist on the second side (back side) of the temporary substrate (1) is performed directly before the step of selectively removing the temporary substrate (1), selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results (MPEP §2144.04 IV(C); *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)).

Regarding claim 11, Van Andel further discloses that the process is carried out in a roll-to-roll process (P1/L15-21 and P3/L4-9).

9. Claims 1-2, 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Andel et al. (WO 98/13882 A1).

Regarding claims 1 and 6, Van Andel discloses a roll-to-roll process (P1/L15-21 and P3/L4-9) for manufacturing a solar cell foil (figs. 1-13) (claims 1 and 11) (P9/L10-11 and P11/L18-P17/L2) comprising the steps of:

- providing an etchable temporary substrate (1) (fig. 1) (P17/L26-27);

- applying a front electrode (transparent conductor 2) of a transparent conductive oxide (TCO) (F-doped SnO_2) onto the temporary substrate (1) (figs. 2-4) (P18/L1-10);
- applying a photovoltaic layer (PV layer 6) onto the TCO (2) (figs. 5-7) (P18/L11-21);
- applying a back electrode (aluminum layer 10) (figs. 8-10) (P18/L23-27);
- applying a permanent carrier (carrier 14) (figs. 11-12) (P19/L1-4);
- ensuring the front electrode (2) and the back electrode (10) are electrically connected in an interconnect (9) (figs. 8-10) to establish a series connection (figs. 8-10) (P17/L7-15 and P18/L23-27),
    - the front (2) and the back (10) electrodes each being interrupted by a front (grooves 5 as shown in fig. 4) and back (grooves 12 as shown in fig. 10) grooves, respectively, at different sides of the interconnect (9) (see figs. 4 and 10 for configuration);
- wherein in any of the preceding steps, applying an etch resist is provided on a second side (bottom side) of the temporary substrate (1) opposite to a first side (top side) of the temporary substrate (1) covering the interconnect (9) (fig. 10), and at least not at the entire location of the front groove (5) (P5/L12-21 and P16/L27-P17/L2); and
- followed by selectively removing the temporary substrate (1) where it is not covered with the etch resist (figs. 11-13) (P5/L12-21, P16/L27-P17/L2 and P19/L1-7) to obtain the solar cell foil provided with a protective cap (contact for

connection to any auxiliary apparatus or net) (portion of the substrate which is not etched) (P5/L12-21 and P16/L27-P17/L2) on the TCO (2).

Although Van Andel does not explicitly state that the etch resist covers the interconnect (9) (fig. 10), this feature is implicit as a result of the application of the etch resist on the temporary substrate (1) at the locations where it is not needed that the incident light reach the transparent conductor (1) (P16/L27-P17/L2) (because these locations are not active parts of the solar cell foil that generates hole and electrons upon absorbing incident solar radiation) (MPEP §2144.01). Van Andel explicitly shows in figure 10 that there is no active part (no PV layer) of the solar cell foil at the position of the interconnect (9), and therefore, the etch resist is implicitly applied on the temporary substrate (1) at the locations (9) (fig. 10) because it is not needed that the incident light reach the transparent conductor (1) (P16/L27-P17/L2) (MPEP §2144.01). Thus, the etch resist is implicitly formed on the interconnect (9) and in results covers the interconnect (9).

Van Andel discloses that the temporary substrate (1) is made of metal (P9/L10-11, P17/L26-27), and a part of the temporary substrate (1) is not etched out so that it can form a contact (instant claimed protective cap) on the TCO (2) (P5/L12-21 and P16/L27-P17/L2). It is well known to one skilled in the solar or photovoltaic art to electrically isolate the anodes or cathodes of adjacent solar cells in a series connection solar cell foil to avoid short-circuits (for example see US 4,243,432 which discloses that anodes or cathodes (12) of the adjacent solar cells of a series connected solar cell foil are electrically isolated from one another (fig. 2) (6:1-21)). Thus, one skilled in the solar or photovoltaic art realizes that a portion of the metal substrate (1) at the front groove 5 (fig. 6) is implicitly removed such that two adjacent stripes (2)

electrically isolated from each other to avoid short-circuit (MPEP §2144.01). Therefore, Van Andel implicitly teaches that the etch resist is not provided at the entire location of the front groove, because the temporary substrate (1) is made of metal (P9/L10-11 and P17/L26-27) and leaving a portion of such substrate covering the entire front groove would electrically connect two adjacent stripes (2), which in results short-circuits the series connected solar cell foil, and thus, the solar cell foil of Van Andel would not function properly (MPEP §2144.01).

In an alternative, "the rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law" (MPEP §2144 (I)). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have the etch resist of Van Andel not provided at the some location of the front groove (5) (figs 4 and 10) such that the portion of the substrate at the front groove (5) is removed in order to electrically isolate two adjacent stripes (4) of transparent conductive oxide to avoid short-circuit of the solar cell foil (MPEP §2144.01).

Regarding claim 2, Van Andel further discloses that the step of applying the etch resist on the second side (back side) of the temporary substrate (1) is performed before the step of selectively removing portions of the temporary substrate (1) (P16/L27-P27/L2). Although the reference is silent as to whether the step of applying the etch resist on the second side (back side) of the temporary substrate (1) is performed directly before the step of selectively removing the temporary substrate (1), selection of any order of performing process steps is prima facie obvious

in the absence of new or unexpected results (MPEP §2144.04 IV(C); *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)).

Regarding claims 6 and 11, Van Andel further discloses that the process is carried out in a roll-to-roll process (P1/L15-21 and P3/L4-9).

10. Claims 3-4, 9 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Andel as applied to claim 1 and/or 2 above, and further in view of Morikawa et al. (US 5,637,510).

Regarding claims 3 and 9, Applicant is directed above for complete discussion of claim 1 and/or 2, which is incorporated herein. However, the reference is silent as to whether the etch resist is a permanent etch resist.

Morikawa teaches a method of selective etching of a temporary substrate of a solar cell wherein a permanent etch resist is utilized to etch away the portion of the substrate which is not covered by the etch resist (fig.1) (4:20-35).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the permanent etch resist of Morikawa in the method of Van Andel in order to selectively etch away the portion of the substrate not covered by the etch resist, as shown by Morikawa, and also desired by Van Andel (P16/L27-P17/L2).

Regarding claim 4, Van Andel in view of Morikawa further discloses that a color of the etch resist is selected such that the color of the etch resist matches or contrasts (implicitly) with a color of an energy-generating part of the solar cell unit.

Regarding claims 12 and 13, Van Andel in view of Morikawa further discloses that the process is carried out in a roll-to-roll process (P1/L15-21 and P3/L4-9).

11. Claims 1-2, 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Andel et al. (WO 98/13882) in view of Jordan et al. (US 4,243,432).

Regarding claims 1 and 6, Van Andel discloses a roll-to-roll process (P1/L15-21 and P3/L4-9) for manufacturing a solar cell foil (figs. 1-13) (claims 1 and 11) (P9/L10-11 and P11/L18-P17/L2) comprising the steps of:

- providing an etchable temporary substrate (1) (fig. 1) (P17/L26-27);
- applying a front electrode (transparent conductor 2) of a transparent conductive oxide (TCO) (F-doped SnO_2) onto the temporary substrate (1) (figs. 2-4) (P18/L1-10);
- applying a photovoltaic layer (PV layer 6) onto the TCO (2) (figs. 5-7) (P18/L11-21);
- applying a back electrode (aluminum layer 10) (figs. 8-10) (P18/L23-27);
- applying a permanent carrier (carrier 14) (figs. 11-12) (P19/L1-4);
- ensuring the front electrode (2) and the back electrode (10) are electrically connected in an interconnect (9) (figs. 8-10) to establish a series connection (figs. 8-10) (P17/L7-15 and P18/L23-27),
    - the front (2) and the back (10) electrodes each being interrupted by a front (grooves 5 as shown in fig. 4) and back (grooves 12 as shown in fig. 10)

grooves, respectively, at different sides of the interconnect (9) (see figs. 4 and 10 for configuration);

- wherein in any of the preceding steps, applying an etch resist is provided on a second side (bottom side) of the temporary substrate (1) opposite to a first side (top side) of the temporary substrate (1) covering the interconnect (9) (fig. 10), and at least not at the entire location of the front groove (5) (P5/L12-21 and P16/L27-P17/L2); and
- followed by selectively removing the temporary substrate (1) where it is not covered with the etch resist (figs. 11-13) (P5/L12-21, P16/L27-P17/L2 and P19/L1-7) to obtain the solar cell foil provided with a protective cap (contact for connection to any auxiliary apparatus or net) (portion of the substrate which is not etched) (P5/L12-21 and P16/L27-P17/L2) on the TCO (2).

Although Van Andel does not explicitly state that the etch resist covers the interconnect (9) (fig. 10), this feature is implicit as a result of the application of the etch resist on the temporary substrate (1) at the locations where it is not needed that the incident light reach the transparent conductor (1) (P16/L27-P17/L2) (because these locations are not active parts of the solar cell foil that generates hole and electrons upon absorbing incident solar radiation) (MPEP §2144.01). Van Andel explicitly shows in figure 10 that there is no active part (no PV layer) of the solar cell foil at the position of the interconnect (9), and therefore, the etch resist is implicitly applied on the temporary substrate (1) at the locations (9) (fig. 10) because it is not needed that the incident light reach the transparent conductor (1) (P16/L27-P17/L2) (MPEP §2144.01). Thus,

the etch resist is implicitly formed on the interconnect (9) and in results covers the interconnect (9).

Van Andel discloses that the temporary substrate (1) is made of metal (P9/L10-11, P17/L26-27), and a part of the temporary substrate (1) is not etched out so that it can form a contact (instant claimed protective cap) on the TCO (2) (P5/L12-21 and P16/L27-P17/L2). It is well known to one skilled in the solar or photovoltaic art to electrically isolate the anodes or cathodes of adjacent solar cells in a series connection solar cell foil to avoid short-circuits (for example see US 4,243,432 which discloses that anodes or cathodes (12) of the adjacent solar cells of a series connected solar cell foil are electrically isolated from one another (fig. 2) (6:1-21)). Thus, one skilled in the solar or photovoltaic art realizes that a portion of the metal substrate (1) at the front groove 5 (fig. 6) is implicitly removed such that two adjacent stripes (2) electrically isolated from each other to avoid short-circuit (MPEP §2144.01). Therefore, Van Andel implicitly teaches that the etch resist is not provided at the entire location of the front groove, because the temporary substrate (1) is made of metal (P9/L10-11 and P17/L26-27) and leaving a portion of such substrate covering the entire front groove would electrically connect two adjacent stripes (2), which in results short-circuits the series connected solar cell foil, and thus, the solar cell foil of Van Andel would not function properly (MPEP §2144.01).

In an alternative, "the rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law" (MPEP §2144 (I)). Jordan teaches a method of making a series connected solar cell foil wherein two

adjacent TCO strips (12), which is made of SnO_2, are electrically isolated from one another (fig. 2) (6:1-21) in order to avoid short-circuit. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have the etch resist of Van Andel not provided at the some location of the front groove (5) (figs 4 and 10) such that two adjacent stripes (4) of transparent conductive oxide are electrically isolated to avoid short-circuit of the solar cell foil (MPEP §2144.01).

Regarding claim 2, Van Andel further discloses that the step of applying the etch resist on the second side (back side) of the temporary substrate (1) is performed before the step of selectively removing portions of the temporary substrate (1) (P16/L27-P27/L2). Although the reference is silent as to whether the step of applying the etch resist on the second side (back side) of the temporary substrate (1) is performed directly before the step of selectively removing the temporary substrate (1), selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results (MPEP §2144.04 IV(C); *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)).

Regarding claims 6 and 11, Van Andel further discloses that the process is carried out in a roll-to-roll process (P1/L15-21 and P3/L4-9).

12. Claims 3-4, 9 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Andel in view of Jordan as applied to claim 1 and/or 2 above, and further in view of Morikawa et al. (US 5,637,510).

Regarding claims 3 and 9, Applicant is directed above for complete discussion of claim 1 and/or 2, which is incorporated herein. However, the reference is silent as to whether the etch resist is a permanent etch resist.

Morikawa teaches a method of selective etching of a temporary substrate of a solar cell wherein a permanent etch resist is utilized to etch away the portion of the substrate which is not covered by the etch resist (fig.1) (4:20-35).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the permanent etch resist of Morikawa in the method of Van Andel in view of Jordan in order to selectively etch away the portion of the substrate not covered by the etch resist, as shown by Morikawa, and also desired by Van Andel (page 16, line27 to page 17, line 2).

Regarding claim 4, Van Andel in view of Morikawa further discloses that a color of the etch resist is selected such that the color of the etch resist matches or contrasts (implicitly) with a color of an energy-generating part of the solar cell unit.

Regarding claims 12-13, Van Andel in view of Jordan and Morikawa further discloses that the process is carried out in a roll-to-roll process (P1/L15-21 and P3/L4-9).

Response to Arguments

13. Applicant's arguments filed on 09/03/2010 have been fully considered but they are not persuasive.

On pages 6-9 of Remarks, Applicant argues that Van Andel fails to disclose that the etch resist covers the interconnect (9).

The examiner respectfully disagrees. Although Van Andel does not explicitly state that the etch resist covers the interconnect (9) (fig. 10), this feature is implicit as a result of the application of the etch resist on the temporary substrate (1) at the locations where it is not needed that the incident light reach the transparent conductor (1) (P16/L27-P17/L2) (because these locations are not active parts of the solar cell foil that generates hole and electrons upon absorbing incident solar radiation) (MPEP §2144.01). Van Andel explicitly shows in figure 10 that there is no active part (no PV layer) of the solar cell foil at the position of the interconnect (9), and therefore, the etch resist is implicitly applied on the temporary substrate (1) at the locations (9) (fig. 10) because it is not needed that the incident light reach the transparent conductor (1) (P16/L27-P17/L2) (MPEP §2144.01). Thus, the etch resist is implicitly formed on the interconnect (9) and in results covers the interconnect (9).

On pages 6-9 of Remarks, Applicant also argues that Van Andel fails to disclose that the etch resist is applied at least not at the entire location of the front groove.

The examiner respectfully disagrees. Van Andel discloses that the temporary substrate (1) is made of metal (P9/L10-11, P17/L26-27), and a part of the temporary substrate (1) is not etched out so that it can form a contact (instant claimed protective cap) on the TCO (2) (P5/L12-21 and P16/L27-P17/L2). It is well known to one skilled in the solar or photovoltaic art to electrically isolate the anodes or cathodes of adjacent solar cells in a series connection solar cell foil to avoid short-circuits (for example see US 4,243,432 which discloses that anodes or cathodes (12) of the adjacent solar cells of a series connected solar cell foil are electrically isolated from one another (fig. 2) (6:1-21)). Thus, one skilled in the solar or photovoltaic art realizes that a portion of the metal substrate (1) at the front groove 5 (fig. 6) is implicitly removed such that two adjacent

stripes (2) electrically isolated from each other to avoid short-circuit (MPEP §2144.01). Therefore, Van Andel implicitly teaches that the etch resist is not provided at the entire location of the front groove, because the temporary substrate (1) is made of metal (P9/L10-11 and P17/L26-27) and leaving a portion of such substrate covering the entire front groove would electrically connect two adjacent stripes (2), which in results short-circuits the series connected solar cell foil, and thus, the solar cell foil of Van Andel would not function properly (MPEP §2144.01).

In an alternative, "the rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law" (MPEP §2144 (I)). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have the etch resist of Van Andel not provided at the some location of the front groove (5) (figs 4 and 10) such that the portion of the substrate at the front groove (5) is removed in order to electrically isolate two adjacent stripes (4) of transparent conductive oxide to avoid short-circuit of the solar cell foil (MPEP §2144.01).

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GOLAM MOWLA whose telephone number is (571) 270-5268. The examiner can normally be reached on M-Th, 0800-1830 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ALEXA NECKEL can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. M./
Examiner, Art Unit 1723

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1723